CLAIMS

What is claimed is:

1. A metal oxide semiconductor field effect transistor (MOSFET) used in ink-jet head chips, which is connected to an inkjet actuator for controlling the electrical voltage or current passing through the inkjet actuator; the MOSFET comprising at least a source, a drain, and a gate and being characterized in that: the MOSFET is covered with a borophosphosilicate glass (BPSG); at least one contact hole through the BPSG is filled with a plug material at the position corresponding to the drain; the gate length is between 0.35 μ m and 3.5 μ m, and the sum of junction depths at the source and the drain is 0.2 to 0.75 times that of the gate length.

2. The metal oxide semiconductor field effect transistor of claim 1, wherein the BPSG has a thickness between 150nm and 1000nm.

3. The metal oxide semiconductor field effect transistor of claim 1, wherein the BPSG has a boron content between 0.5wt% and 6.0wt%.

4. The metal oxide semiconductor field effect transistor of claim 1, wherein the BPSG has a reflow temperature between 850℃ and 925℃.

5. The metal oxide semiconductor field effect transistor of claim 1, wherein the plug material has a thickness between 0.01 μ m and 1.0 μ m.

6. The metal oxide semiconductor field effect transistor of claim 1, wherein the plug material is one selected from the group consisting of W, Pt, Ti, Co, Ni, Mo, Ta, Si, and their alloys and compounds.

7. A chip structure of an integrated-driver ink-jet head, comprising:

a plurality of MOSFETs, which contains at least one gate, a source, and a drain, wherein the MOSFET is covered with a borophosphosilicate glass (BPSG); at

least one contact hole through the BPSG is filled with a plug material at the position corresponding to the drain; the gate length is between 0.35 μm and 3.5 μm, and the sum of junction depths at the source and the drain is 0.2 to 0.75 times that of the gate length;

a plurality of actuators, which are in electrical communications with the MOSFETs for providing the energy to eject fluid out; and

a plurality of fluid-flow structures, which define at least one fluid-flow channel on an fluid-chamber and a nozzle for the fluid to refill and are in communications with said actuators to eject fluid out.

8. The chip structure of claim 7, wherein the BPSG has a thickness between 150nm and 1000nm.

9. The chip structure of claim 7, wherein the BPSG has a boron content between 0.5wt% and 6.0wt%.

10. The chip structure of claim 7, wherein the BPSG has a reflow temperature between 850℃ and 925℃.

11. The chip structure of claim 7, wherein the plug material has a thickness between 0.01 μm and 1.0 μm.

12. The chip structure of claim 7, wherein the plug material is at least one selected from the group consisting of W, Pt, Ti, Co, Ni, Mo, Ta, Si, and their alloys and compounds.

13. A manufacturing method for making MOSFETs used in an ink-jet head chip, comprising the steps of:

defining at least one active region on the substrate;

defining at least one gate insulator and at least one gate on the active region, the

gate length is between 0.35 μm and 3.5 μm;

doping impurities into the drain, the sum of junction depths at the source and the drain is 0.2 to 0.75 times that of the gate length; and

covering the active region with a BPSG, and forming at least one contact hole filled with a plug material at the positions corresponding to the drain.

14. The method of claim 13 further comprising the step of forming a drain junction depth deeper than the subsequently both sides dopant depth on one side of the predetermined drain position on the gate, before the step of doping impurities on both sides of the gate to form a drain and a source.

15. The method of claim 13, wherein the BPSG has a thickness between 150nm and 1000nm.

16. The method of claim 13, wherein the BPSG has a boron content between 0.5wt% and 6.0wt%.

17. The method of claim 13, wherein the BPSG has a melting temperature between 850 ℃ and 925℃.

18. The method of claim 13, wherein the plug material has a thickness between 0.01 μm and 1.0 μm.

19. The method of claim 13, wherein the plug material is at least one selected from the group consisting of W, Pt, Ti, Co, Ni, Mo, Ta, Si, and their alloys and compounds.